

**• ТЕОРЕТИКО-МЕТОДИЧНІ АСПЕКТИ ФІЗИЧНОЇ РЕАБІЛІТАЦІЇ****• THEORETICAL AND METHODOLOGICAL ASPECTS OF PHYSICAL REHABILITATION**

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**THE EFFECT OF PHYSIOTHERAPY  
ON COGNITIVE AND COORDINATION  
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e-mail: [annabutorova519@gmail.com](mailto:annabutorova519@gmail.com)***ВПЛИВ ФІЗИЧНОЇ ТЕРАПІЇ НА КОГНІТИВНІ ТА КООРДИНАЦІЙНІ НАВИЧКИ В ОСІБ ПОХИЛОГО ВІКУ. Анна БУТОРОВА.** *Кафедра фізичної терапії, Факультет охорони здоров'я, Католицький університет Ружомберока, e-mail: [annabutorova519@gmail.com](mailto:annabutorova519@gmail.com)*

**Анотація.** Старіння – це процес, наслідком якого є погіршення морфологічного і функціонального стану та когнітивних навичок. Унаслідок цього маємо погіршення здатності давати собі раду з повсякденною життєвою активністю та зменшення якості життя. З віком погіршується здатність утримувати рівновагу і зростає ризик падіння. З огляду на це, одним з основних завдань реабілітації є стимулювання і реабілітація когнітивних та координаційних навичок, які погіршилися через процес природного старіння тіла чи дегенеративними хворобами. У цій статті на основі інтерпретації результатів зарубіжних та вітчизняних досліджень описано ефект від застосування фізичної терапії щодо координаційних і рухових порушень в осіб похилого віку.

**Ключові слова:** фізична терапія, рівновага, порушення, літні люди.

**Introduction.** Old age and aging is an essential part of human life. Aging is a process, resulting in deterioration of morphological, functional, and cognitive skills. As a consequence, there is a deterioration in coping with activities of daily living and reduced quality of life. Research confirms that aging reduces all cognitive functions, including psychomotor speed, decision making, attention and memory [3,16]. With ages the balance abilities worsen, many aspects of postural control get disrupted and risk of falls increases [17, 20].

In recent years there has been a significant improvement in the level of care for the elderly in outpatient sphere and in health and social care services. Extra services are offered, the aim of which is the improvement of the quality of life of elderly and support for staying at home. The new paradigm of sciences creates a better understanding of old age, the role and needs of the elderly, with a purposeful focus on comprehensiveness, integrity, interdependence, interdisciplinarity, individualization, ethics and the search for the meaning of life [9, 10]. These facts require new approaches, new structures and new learning in the field of aging with an integral part of team cooperation in various fields.

For these reasons, one of the main tasks of neuropsychology and rehabilitation, in addition to adequate and proper diagnosis, is the stimulation and rehabilitation of cognitive and coordination skills that are disrupted by natural aging of the body or by a degenerative disease [7, 8].

Recently, a number of studies were conducted with a focus on non-pharmacological treatment tests (different types of cognitive training and cognitive strategies as part of rehabilitation programs) to move from practice via e. g. methods pencil-paper to training methods based on the use of computer technology, virtual reality and simulation [6, 11, 12]. At present, in this area the main task is to develop effective cognitive games and programs with the corresponding thera-

peutic effect, with the possibility of their use in everyday life and their expected impact on the quality of life of elderly.

The effectiveness of cognitive functions training and coordination abilities in the elderly are generally positive, whether in terms of memory and attentional training, skills training and executive decision-making functions, as well as various types of physical training [5]. Effectiveness of such training in terms of improving performance in cognitive and coordination skills can be not only immediate, but its positive effect may persist for long periods because the nervous system of older people has a certain plasticity and responds well to targeted interventions [9].

This paper describes the effects of physiotherapy of cognitive and coordination disorders based on review of foreign and domestic studies.

In order to improve the health condition in elderly with regard to cognitive and coordination disorders following strategies are used:

**Cognitive training, Cognitive stimulation therapy, Rehabilitation of cognitive functions and Exercise program.**

**Cognitive training.** Cognitive training includes a series of standardized tasks. Each task focuses on a different cognitive domain. Currently cognitive video-plays become very popular.

Vilans [21], for example, monitored the effects of cognitive training strategy aimed at reducing disability due to mental slowed down. He describes the level of abilities of decision-making in patients that solve complex cognitive tasks. In elderly people with mental slowdown their ability of decision making is not affected, when they are given enough time. Nevertheless, these elderly people should try to increase the speed of decision making by performing appropriate cognitive exercises. The important thing is the awareness of deficits in these elderly and the importance of their improvement in everyday life and in cases of extreme urgency by implementation of the appropriate strategy and its subsequent use in more demanding circumstances. Also important is the right motivation and self-motivation to learn these strategies by elderly.

**Cognitive stimulation therapy.** Cognitive stimulation – includes performing a variety of activities (usually in small groups) to improve cognitive and social functions. It can be performed through play. Such level of therapy is chosen which the participants are able to handle. Part of therapy should be aimed at training long-term memory, which is usually long maintained. With short-term memory recalling and maintaining is usually broken. The training of orientation in reality can be included. It contains three main types of activities: communication – the stimulation of language and communication skill.

Cognitive stimulation therapy is a structured program that trained therapists lead.

Individual sessions include the following thematic elements: physical games, singing songs, childhood memories, food, current events, phrases, creativity, sorting concepts, orientation, manipulation of money, math problems, team quiz, discussion on the art, on of households, family.

Spector [18,19] in his system overview of the studies evaluated the effects of cognitive stimulation therapy in the elderly with MCI and Alzheimer's disease by applying three kinds of cognitive stimulation therapy: Communication – the stimulation of language and communication skills. Memory – stimulating long-term memory, semantic memory, and learning new information. Functionality and senses – stimulation of senses and functional roles. An important finding was that the improvement was not only in cognitive functions, but also in the quality of life of elderly. On the other hand, however, in the system overview Aguire [1] found that cognitive stimulation therapy alone is not sufficient enough to improve the management of the activities of daily life in the elderly with MCI and Alzheimer's disease.

Niu [15] in their randomized study described the effectiveness of the stimulation of cognitive therapy in the treatment of neuropsychiatric symptoms in elderly people with Alzheimer's disease. 44 patients were randomly assigned to a group of patients with cognitive stimulation treatment and control groups. The duration of training was 10 weeks. Evaluation method was the Mini Mental State Examination and the Neuropsychiatric Inventory. After 10 weeks of treatment in cognitively – stimulated group there were significant improvements compared to the control group in the

symptoms of depression and apathy. In other items, however, there were no significant differences between the groups.

**Cognitive rehabilitation.** Cognitive rehabilitation – is an approach that clearly defined objectives and targets of therapy. The therapist works with the patient and family using the chosen strategy. The focus is on improving coping with activities of daily living, not only for improvements in tests to assess cognitive function (Woods, 2012).

According to Halligan (2005), cognitive rehabilitation is systematic, function-oriented activity in the field of cognitive therapy, which takes into account and assesses the cerebral deficits of a person. It aims to achieve a functional change by: strengthening or restoring already learned – acquired behavior patterns, creating new models of cognitive activity or compensation mechanisms for impaired neurological systems. It can be conducted individually or in groups. (Hátlová, 2005).

Nair [16] studied the effects of memory cognitive rehabilitation. In his study there were no significant differences between the groups: an experimental group with intervention using compensatory strategies and the control group without training in Self- Assessment of memory problems in coping with activities of daily living. Further studies are required that would explore and assess the effects of different types of rehabilitation of memory and cognitive functions.

Hildebrandt [13] studied the effect of cognitive memory rehabilitation and learning processes in the elderly. Which memory training module had the best effect, however, remains uncertain. The effect of his cognitive memory rehabilitation seems not to have desired effect on performing daily activities of elderly people. Further research is needed that would specify more clearly on which aspects of daily life this training of memory has more profound effect.

**Exercise program.** Shumway-Cook [17], in his study used a multidimensional exercise program. Activities included balance exercises sitting, standing and walking, anticipation balance activities including stretching, lifting, bending, turning, at different support from narrow base position, standing on one leg, tandem stance, walking over obstacles, walking back and forth with change of speed, walking on different surfaces.

Reactive balance control included various speeds, directions and step length changes and sensory training. Exercises with increasing demand lasted eight weeks. Compared with the group without training significant improvements were recorded in Tinetti assessment of the balance (POMA), in Berg's balance scale (BBS) and in the dynamic component of the balance evaluated through Dynamic Gait Index (DGI).

Gillepie [4], monitored 111 randomized studies and investigated the effect of different types of interventions on the number of falls in elderly with neurological diseases. The criteria included multifactorial intervention, intervention for safe environment at home and also pharmacotherapy interventions. Multifactorial intervention reduced the number of falls and risk of falls to 95 %. No sufficient evidence was found for interventions that would have a significant impact on reducing falls in patients with stroke, Parkinson's disease and hip fractures. Sufficient training time to improve the state is considered to be 50 hours or more. What is important, it is regular training of learned strategies at least 30 minutes, or an hour a day.

**Conclusion.** The paper aimed to describe the effect of physiotherapy on cognitive and coordination disorders in elderly based on review of foreign and domestic studies. Appropriately selected cognitive exercises combined with physical exercise, as well as multifactorial interventions can have a positive effect on improving cognitive and motor abilities to cope with the activities of daily living and quality of life. It is important, however, to continue monitoring the effect of similar interventions to improve coordination abilities. It has been proved that combination of cognitive and physical exercises performed at the same time in form of dual tasks shows better results than when performed separately. Elderly people should be encouraged to be more active and perform all kind of exercise that help to maintain their cognitive and physical abilities.

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## **ВЛИЯНИЕ ФИЗИЧЕСКОЙ ТЕРАПИИ НА КОГНИТИВНЫЕ И КООРДИНАЦИОННЫЕ НАВЫКИ У ЛИЦ ПОЖИЛОГО ВОЗРАСТА**

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**Аннотация.** Старение – это процесс, следствием которого является ухудшение морфологического и функционального состояния и когнитивных навыков. Вследствие этого имеем ухудшение способности справляться с повседневной жизненной активностью и уменьшение качества жизни. С возрастом ухудшается способность удерживать равновесие и возрастает риск падения. В связи с этим, одним из основных заданий реабилитации является стимулирование и реабилитация когнитивных и координационных навыков, которые ухудшились в связи с процессом естественного старения тела или дегенеративными болезнями. В этой статье на основании интерпретации результатов зарубежных и отечественных исследований описан эффект от применения физической терапии относительно координационных и двигательных нарушений у лиц пожилого возраста.

**Ключевые слова:** физическая терапия, равновесие, нарушения, пожилые люди.

## THE EFFECT OF PHYSIOTHERAPY ON COGNITIVE AND COORDINATION SKILLS IN ELDERLY

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**Abstract.** Aging is a process, resulting in deterioration of morphological, functional, and cognitive skills. As a consequence, there is a deterioration in coping with activities of daily living and reduced quality of life. With age balance abilities worsen and the risk of falls increases. For these reasons, one of the main tasks of rehabilitation is the stimulation and rehabilitation of cognitive and coordination skills that are disrupted by natural aging of the body or by a degenerative disease. This paper describes the effect of physiotherapy on coordination and cognitive disorders in the elderly based on the interpretation of the results of foreign and domestic studies.

**Keywords:** physiotherapy, balance, disorders, elderly people.

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